

repeating themselves then start afresh into growth, and rise rapidly, through intermediate, to the higher forms. The spiral character of the progress, and the fact that the tide of life passes from planet to planet in gushes, accounts for the gaps in the various kingdoms of Nature. Each time a spiritual monad arrives on a planet it has a complicated process of evolution to perform. It is many times incarnated before it passes onward, and man has many incarnations in each great race, the normal sum being not far short of 800, with an interval of at least 1500 years between each, spent in the "world of effects, or heaven of ordinary theology." In the first planetary round man inhabited an immense but loosely organised body, and could not be called intellectual. In the second he becomes of firmer body, whilst in the third he is rather in form of a giant ape than true man, yet of concrete body and advanced intelligence. In the fourth, the present round, his intellect becomes fully developed, and he achieves enormous progress. We now approach the transcendental mystery of mysteries, our future development. The fifth round will be occupied with a struggle between physical intellect and spirituality. In the sixth round a state of perfection of body and soul will be attained which can hardly even be imagined; while as to the seventh round the occult teachers themselves are solemnly silent, it being altogether too God-like for realisation. At the end of each planetary round an intercylic period of extraordinary exaltation must be undergone. It is by processes of occult training that adepts project themselves precociously into the fifth round, or possess themselves of the attributes of fifth-round men, so as to be able to explore the mysteries of Nature and of other states of existence, and to assimilate knowledge by clairvoyance independently of observation.

We now exist in the fifth race of the fourth round. The first and second races developed no civilisation, but the third and fourth did do so several millions of years ago, though no traces of such now exist. The periods of the great root races are divided by vast convulsions or geological changes, which cut them off at the appointed time, leaving only a few survivors behind, who rapidly relapse into barbarism. The fourth race lived on "Atlantis," and reached its apogee in "the Eocene Age," when this great continent showed the first symptoms of sinking, a process that occupied it down to 11,446 years ago, when its last island, Poseidonis, went down with a crash. "Lemuria" was drowned with its high civilisation and gods about 700,000 years earlier than Atlantis, or just before the early part of the Eocene Age, the relics of its third-race inhabitants existing in some of the flat-headed aborigines of Australia. The true Chinaman is interesting as a relic of the fourth race. The civilisations of the ante-Glacial period were superior to those of Greece and Rome, or the Egyptian, which was in its decadence 12,000 years ago. The uninhabited Arctic regions will prove not only to have enjoyed a tropical climate, but were likewise the seat of one of the most ancient civilisations of the fourth race. Atlantis belonged to the Miocene times, and the cataclysm which destroyed it came at the appointed time, "otherwise it would be impossible for the best seer to calculate the exact hour and year when such cataclysms great and small have to occur." The relics of these former civilisations are hidden in strata which have never been geologically explored, deep in the unfathomed ocean beds.

An important part of the Buddhist creed is the belief in the alternation of periods of repose with periods of activity. As man sleeps every twenty-four hours, and vegetation subsides and revives with the seasons, so rest periods follow each incarnation. The tide-wave of humanity flows on to each of the seven planets seven times, and passes through its seven races and ebbs away again, but the great rest period of our planetary chain does not begin until the seventh round of humanity is

perfected. At an incalculably remote period the whole of the seven planetary chains of our solar system will pass into a period of rest, and finally the whole universe itself will have its great cosmic night. After the long night of a planetary chain the animal and vegetable world resume their arrested activity, but when the time arrives for all the planetary chains of our system to pass into their night, each planet, as the seventh-round man quits it, is annihilated instead of merely becoming invisible, and there is an outflow from every kingdom of its entities. These will rest in lethargic sleep in space until brought into life again at the next solar period, and will then form the soul of the future globe. We have every indication that at this very moment such a solar night is taking place, while there are two minor ones ending somewhere. At the beginning of the next solar day period the hitherto subjective elements of the material worlds, now scattered in cosmic dust, will form into primordial ripples of life, and, separating into differentiating centres of activity, combine in a graduated scale of seven stages of evolution. Every orb will pass through seven stages of density, until its solidification and desiccation at last reach a point when it becomes a relaxed conglomerate, and its constituent masses cease to obey the laws of cohesion which hold them together.

Evolution takes its rise in the atomic polarity which motion engenders. In cosmogony the active and passive forces correspond to the male and female principles. The attribute of the universal spiritual principle is to expand and shed, of the material principle to gather and fecundate. These become consciousness and life when brought together. Our planet, like an iceberg, is merely a state of being for a given time, and its present appearance, geological and anthropological, is but transitory and will pass away.

Such are the beliefs and doctrines concerning evolution<sup>1</sup> held by the Oriental scholar, who holds in pity the benighted ignorance of Western so-called science. The book from which they are gathered is sober earnest, and I am asked whether the Buddhist ideas on evolution are in accord with the discoveries of science. The mere statement of the belief, shorn of its mysticism, is a sufficient answer. The importance attached to the numeral 7 seems puerile, and its reason is not easy to discover; it is claimed that the colours of the spectrum and the notes of the musical scale are seven, and that there are seven kingdoms in Nature. There is one seeming scientific fact, however, which, though it has escaped the "adepts," favours so far the belief in evolution by gushes, and is still unexplained. The first appearance of many forms of life on our planet, it is well known, is very sudden. All the groups of Mollusca, and especially in the case of Ammonites, appear at once fully developed and in great variety of species, and never develop into anything higher. So with the Echinodermata, the Crustacea, Insecta, the different orders of fishes, many orders of reptiles, marsupials, ferns, and dicotyledons. All these seem to have been evolutionised in a very sudden manner, and as yet afford no grounds for controverting the Buddhist belief that they are well developed arrivals from other planets.

J. STARKIE GARDNER

#### THE RAINFALL OF 1884

THE water famine with which the towns of Manchester and Bradford have recently been threatened has served to draw public attention to the fact that the rainfall of the present year has been strikingly deficient. As the extent of the deficiency is, however, little, or at the best imperfectly, realised, a few reliable statistics on the subject may be of more than ordinary interest.

The following table shows, for seventeen places situated

<sup>1</sup> Condensed from Mr. A. P. Sinnett's book, "Esoteric Buddhism" (Trübner and Co.), and as far as possible in his own words.

in various parts of the United Kingdom, the excess or deficit of rain which has occurred during the first, second, and third quarters of the present year, and also similar values for the month of October. In the last column we have the number of months in which the rainfall has been less than the average. It must, however, be explained that these numbers do not necessarily signify consecutive months. The values in the table have been compiled from the Monthly and Weekly Weather Reports issued by the Meteorological Office, and the averages employed have been those for the fifteen years 1866 to 1880.

Recording stations	Excess or deficit					No. of months with deficiency of rain
	January to March	April to June	July to September	October	The whole ten months	
ENGLAND AND WALES						
York ... ..	+ 33	- 54	- 18	- 70	- 22	6
Stonyhurst ... ..	+ 31	- 46	- 21	- 29	- 13	7
Blackpool ... ..	+ 41	- 32	- 14	- 45	- 2	6
Manchester (Prestwich) ... ..	+ 18	- 44	- 8	- 43	- 14	8
Llandudno ... ..	+ 30	- 32	- 23	- 66	- 17	6
Leicester ... ..	- 13	- 27	- 33	- 39	- 27	8
Hereford ... ..	+ 4	- 19	- 29	- 70	- 23	6
Cirencester ... ..	- 11	- 22	- 29	- 68	- 26	6
Marlborough ... ..	+ 7	- 9	- 37	- 69	- 21	6
Oxford ... ..	- 20	- 24	- 41	- 69	- 34	10
London ... ..	- 28	- 37	- 39	- 62	- 38	10
Cambridge ... ..	- 30	- 28	- 10	- 38	- 23	9
SCOTLAND						
Aberdeen ... ..	+ 22	- 36	- 30	- 8	- 11	7
Leith ... ..	+ 16	- 30	+ 9	- 40	- 5	6
Glasgow ... ..	+ 21	- 34	+ 3	- 17	- 2	6
IRELAND						
Londonderry ... ..	+ 37	- 16	- 11	+ 5	+ 4	5
Dublin ... ..	+ 20	- 33	- 46	- 78	- 29	8

An examination of the first column shows that during the first quarter of the year there was a deficiency of rain over the midland and south-eastern counties of England, but an excess in all other parts of the kingdom. The deficiency was most clearly marked in London and its immediate neighbourhood, where the total fall was from 28 to 30 per cent. less than the average. The excess was greatest in the north-west of England and north of Ireland; in most parts of these districts the aggregate was from 30 to 40 per cent. more than the average, but at Blackpool it was as much as 41 per cent. more.

The figures in the next column show that during the second quarter of the year the weather became much drier, and in fact a deficiency of rain was recorded over the entire kingdom. With the exception of Marlborough, where the falling off amounted to only 9 per cent., and Hereford and Londonderry, where it was respectively 19 and 16 per cent., the deficiency varied between 22 and 54 per cent., the lower value being recorded at Cirencester and the higher at York. Upon the whole it appears that the driest weather was experienced in Scotland, the north and north-west of England, and the neighbourhood of London.

From the figures in the third column it would appear that a very similar state of affairs prevailed in the July to September quarter. With the exception of Leith and Glasgow, where there was a trifling excess, every station in the table again had a deficiency of rain, the districts more seriously affected being the western and southern parts of England and the east of Ireland. In the catchment basin, from which the northern towns derive their water-supply, the deficit was not so strongly marked as in

other parts of the kingdom, and the serious state of affairs which prevailed during October must therefore be set down to a long continued rather than an exceptionally severe spell of dry weather.

The figures for the month of October, given in the fourth column, show that the fall of rain was then abnormally small. At Londonderry, it is true, there was a slight excess, and at Aberdeen the deficit was not particularly striking, but in other parts of the country the falling off was very considerable. At many of the English stations the total for the month was only one-third of the average, while at Dublin it did not amount to as much as one-fourth. The places least affected were Stonyhurst, Leicester, and Cambridge, where the amount was from 29 to 39 per cent. less than the average.

The general result of all these facts, as given in the fifth column, shows that, with the exception of Londonderry, the rainfall of the past ten months has been less than the average in all parts of the kingdom. At Blackpool, Leith, and Glasgow the deficiency has not been particularly remarkable, but elsewhere, and especially in London and the home counties generally, it has been very great. At Oxford, and also in London, the aggregate fall for the period has been only about two-thirds of the average; and there is consequently no reason to doubt that, unless the weather of the remaining few weeks of 1884 undergoes a very sudden and decided change, the total for the year will be unusually small. Up to the present time (November 18) the rainfall for November has only amounted to one-third of the average for the whole month.

The last column in the table gives the number of months during which the amount of rain has been in defect of the average. At Manchester, Leicester, and Dublin there have been eight such periods, and at Cambridge nine; while at Oxford, and also in London, every month has shown a deficiency.

In endeavouring to compare the above figures with those for previous years, the meteorologist is met at the outset by a very familiar difficulty, namely that of finding reliable information for any very long period. As regards London, however, some valuable statistics are to hand in the rainfall diagram prepared some years ago by Mr. George Dines, F.R.Met.Soc. This diagram, which gives the monthly and annual fall of rain in the London district during the sixty years 1813 to 1872, was compiled with great care and precision partly from Luke Howard's observations, partly from the Cobham journals, and to a large extent from information published or supplied by Mr. Symons. By completing the statistics up to the present time, we get a long and very valuable series of returns, and are also able to obtain a really good and reliable average. In the following table are shown the

Years	For the whole year		January to October		No. of months in year with deficiency of rain
	Total fall	Percentage value below average	Total fall	Percentage value below average	
	inches		inches		
1832	19·8	20	16·4	24	9
1837	19·4	22	16·5	24	9
1840	19·4	22	15·5	28	8
1847	17·7	29	13·5	37	11
1850	19·2	23	15·8	27	9
1854	18·7	25	15·3	29	11
1858	17·3	30	15·2	30	8
1864	17·4	30	14·5	33	9
1884	—	—	13·4	38	?

total amounts of rain in London during some of the driest of the past seventy-one years, together with the percentage difference from an average based on the seventy years'



observations 1813 to 1882. In selecting the years, those only have been chosen in which the aggregate fall of rain has been at least 20 per cent. less than the average. The table further gives the total fall and difference from the average for the first ten months in each of these years, and in the last column will be found the number of months during which the rainfall has been deficient.

From the first two columns it appears that the years 1858 and 1864 claim the distinction of being the driest of all, the total falls being only 17.3 inches and 17.4 inches respectively, or 30 per cent. less than the average. Next comes 1847, with a total fall of 17.7 inches and a deficit amounting to 29 per cent. As regards the period of ten months, the present year has been drier than any of the past seventy-one, but in the year 1847 the rainfall was nearly as deficient. In the case of the other dry years the aggregate fall for the ten months was at least an inch more than in either 1847 or 1884, and in the years 1832 and 1837 it was three inches more. On comparing the returns for the past seventy-one years, one more striking fact is brought to light. Out of the whole series there has been only one occasion on which the deficiency of rain has continued through a greater number of months than it has this year. This long period of drought commenced in November 1846 and continued until November 1847, and there were consequently no fewer than thirteen consecutive months during which the rainfall in London was below the average.

FREDK. J. BRODIE

#### ANCIENT CHINESE GEOGRAPHY

NOT long since the Chinese Ambassador to England, in the course of a remarkable speech at Folkestone, twitted European scholars with the labours which they freely bestowed on the study of extinct nations and races, while the still existing civilisation of China, hardly inferior in antiquity to that of any other race, received but scant attention. Whether the charge is well founded or not we cannot pretend to decide here; but there is, we believe, no doubt that there is still in Chinese literature a vast mine, into which but few and trifling shafts have been sunk. The wealth of the geographical literature of China, for instance, is known to but a few scholars, and one of these, M. de Rosny of Paris, in a work recently published on the Oriental nations known to the ancient Chinese, says that, among all the literatures of the East, that of the Chinese probably contains the most valuable information for the study of Asiatic ethnography, for a crowd of nations which have disappeared, or which are unknown in Europe, have been the subject of substantial notices by the Chinese, outside which, probably, we know nothing of their political history or of the annals of their civilisation. M. de Rosny's work, which is published by the Ethnographical Society of Paris, is devoted to the translation and piecing together of extracts from old topographical works respecting various countries known to the Chinese in ancient times. Much of the labour in a work of this kind must necessarily be devoted to identifying the places mentioned. In many cases this has not even now been satisfactorily done. Thus, the origin of the name *Ta-tsin*, applied to the Roman Empire, is wrapped in obscurity. The latest theory is that it is the phonetical representation of Tarsus in Cilicia, whence Antoninus sent ambassadors to Bactria, so that the name of Tarsus was the first echo which China received of Rome. But although there is much in M. de Rosny's volume which can only interest the technical Sinologue, yet one can gather from the text, as well as from the maps, a fairly accurate idea of the knowledge of geography possessed by the Chinese in early times. Of the maps, which are nine in number, one contains the Indian Archipelago as known to the Chinese, and six others Indo-China and Malaysia, according to Chinese geographers, at various periods from the twelfth century before our era down to 906 after Christ.

The Chinese, then, according to M. de Rosny, have from the most remote times occupied themselves with the topography of the districts through which they migrated, and have studied the geography of the neighbouring countries. Yu the Great, who reigned in the basin of the Yellow River twenty-two centuries before our era, was a veritable geographer. The *Shu-king*, which contains an account of the public works executed under his direction, contains the first rudiments of Chinese ethnography, as Genesis does that of the Jews. A geographical work which is probably not less ancient is the *Shau-hai-king*. It is at least as old as the Choo dynasty—1134 B.C.—and some Chinese authors even carry its date back to the twenty-seventh century before Christ. In a book of rites of the Choo dynasty just referred to, it is stated that twenty-four officials were specially charged with the administration of a department for national geography. It is, however, to the historians that we have to look for accounts of the various peoples which early submitted to the preponderating influence of the Middle Kingdom. The nomad hordes of the north and west, and the States then in process of formation in the south, all entered into relations with the Chinese. The ambassadors whom they sent to the Court brought with them information as to the people they represented, which was duly consigned to the archives of the Empire by its historiographers. The officials sent by the Chinese in return to the peoples about them contributed their quota of geographical and ethnographical facts, until ultimately the documents on the subject became so numerous that native scholars judged it well to summarise them into one great work. It was thus that the great encyclopædia associated with the name of Ma-touan-lin was formed. Its first publication was in 1322.

The limits of the world as known to the early Chinese are stated by M. de Rosny to be: in the north, Southern Siberia and Kamchatka; in the east, the Kurile Islands, Japan, the Loochoo Archipelago, and that of the Philippines; in the south-east, Borneo and Celebes; to the south, Java, Sumatra, and Ceylon; to the west, Arabia, Persia, and the States bordering on the Caspian. Some scholars have professed to discover the Roman Empire under the name *Ta-tsin*, and America, which a mission of Shamans are said to have discovered in the fifth century, under that of Fousang. In the work before us the writer gives, from Ma-touan-lin and other sources, the statements of the early Chinese writers with regard to the various races inhabiting these regions; but he warns us more than once that these ancient documents, though of great value in teaching us about peoples little known to us, must be used with the utmost reserve, and only after undergoing a searching examination and criticism. The present instalment of the work deals only with the races to the south, south-east, and east, such as the Japanese, Ainos, Siamese, &c. Its value as an ethnographical and geographical work can only be known to the one or two living Europeans who have made a special study of the subject; but it places beyond doubt the fact that students of the ethnography and historical geography of the Far East will have to reckon with the works of their remote Chinese predecessors before their knowledge can be regarded as complete.

#### COLOUR

M. M. A. ROSENSTIEHL has made an interesting contribution to the science of colour in the form of a *brochure* recently published under the auspices of the Société Industrielle of Rouen, and entitled "Les premiers Eléments de la Science de la Couleur." In this treatise, which is a model of brevity and of demonstrative clearness, the author shows that the empirical methods which have hitherto prevailed amongst colourists of all classes are radically imperfect. These methods are